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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,162	12/15/2003	Ji Yong Park	1514.1030	2087
49455	7590	12/29/2005	EXAMINER	
STEIN, MCEWEN & BUI, LLP 1400 EYE STREET, NW SUITE 300 WASHINGTON, DC 20005			LANDAU, MATTHEW C	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 12/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H/A

**Office Action Summary**

Application No.

10/734,162

Applicant(s)

PARK ET AL.

Examiner

Matthew Landau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 October 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

The drawings were received on October 13, 2005. These drawings are unacceptable.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the primary crystal grain boundaries are inclined to a current direction between active channel regions of the thin film transistor at an angle of  $-45^{\circ}$  to  $45^{\circ}$  (in conjunction with the limitations of claim 1) must be shown or the feature(s) canceled from the claim(s). Note that Figure 6 shows the primary grain boundaries inclined to the current direction at an angle of approximately 90 degrees. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will

be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, 7, 8, and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Isobe et al. (US Pat. 6,890,840, hereinafter Isobe).

Regarding claim 1, 4, 7, and 10, Figures 1A-1E and 3 of Isobe disclose a thin film transistor (TFT) comprising a lightly doped drain (LDD) region 304 (col. 7, lines 35-40), wherein the TFT is formed so that primary crystal grain boundaries of a polysilicon substrate are not positioned in the LDD region. Isobe disclose the crystal aggregate boundaries are located outside of the TFT formation region (col. 6, lines 29-34). It is considered that the aggregate boundaries are the primary grain boundaries. Since there are no primary grain boundaries in the TFT region, there cannot be any primary grain boundaries in the LDD region. Regarding claims 2, 7, and 10, Isobe further discloses the TFT can be used in an active matrix liquid crystal module (LCD) (col. 15, lines 63-65), which is a flat panel display device.

Regarding claims 2 and 8, as stated above, Isobe discloses the primary grain boundaries are located outside the TFT formation region (col. 6, lines 29-34). Therefore, a width of the activation layer including the LDD region must be shorter than a distance between the primary grain boundaries.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US Pat. 5,563,426, hereinafter Zhang) in view of Suzuki et al. (US Pat. 6,274,888, hereinafter Suzuki).

Regarding claims 1, 4, 7, and 10, Figures 1(B), 1(C), and 4(C) disclose a TFT formed so that primary crystal grain boundaries 4 of a polysilicon substrate are formed outside the TFT formation regions. The difference is the TFT comprises an LDD region. Suzuki discloses a TFT comprises an LDD region (col. 7, lines 34-40). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Zhang by including an LDD region for the purpose of reducing short channel effects, which is well-known in the art. Since, as shown in Figure 1(C), the primary grain boundaries are located away from the semiconductor regions 6 that make up the TFTs, the primary grain boundaries

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cannot be located in the LDD region. Regarding claims 4, 7, and 10, Suzuki further discloses the TFT can be used in a liquid crystal display device (i.e., flat panel device) (col. 16, lines 54-57).

Regarding claims 2 and 8, as stated above, Figure 1(C) of Zhang discloses the primary grain boundaries are located away from the semiconductor regions 6 that make up the TFTs. Therefore, a width of the activation layer including the LDD region must be shorter than a distance between the primary grain boundaries.

Regarding claims 3 and 9, product-by-process limitation “wherein the polysilicon substrate is formed by a sequential lateral solidification (SLS) method” does not patentably distinguish the claimed invention.

Regarding claims 5, 6, 11, and 12, Figure 1(C) of Zhang discloses many different primary grain boundaries. Some extend vertically and some extend horizontally, but all the TFTs shown have current flowing in the same direction. Therefore, Figure 1(C) of Zhang discloses primary grain boundaries that are perpendicular to a current direction between active channel regions of the thin film transistor (claims 5 and 11), as well as primary grain boundaries that are inclined to a current direction between active channel regions of the thin film transistor at an angle of zero degrees (i.e., parallel) (claims 6 and 12).

### ***Response to Arguments***

Applicant's arguments filed October 13, 2005 have been fully considered but they are not persuasive.

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Applicant argues that the method disclosed by Isobe is an MILC (metal induced lateral crystallization) method, and that “It is well known in the art that with the MILC method, primary crystal grain boundaries cannot be formed and therefore, Isobe fails to anticipate all the features recited in independent claim 1”. However, Applicant has not provided any evidence to support this allegation that primary crystal grain boundaries cannot be formed. Furthermore, it can be considered that the grain boundaries formed in the process of Isobe are in fact “primary” grain boundaries. Applicant has not explicitly defined “primary grain boundaries” in a manner that would preclude this interpretation. Using the broadest reasonable interpretation, if a device has only one type of grain boundary, those boundaries can be considered “primary” grain boundaries. Note that Applicant makes similar arguments regarding the rejection of Zhang in view of Suzuki. Therefore, the above response also applies to those arguments. Further regarding Zhang, the boundaries 4 shown in Figure 1(B) can certainly be considered primary grain boundaries since they are the intersection of different crystal growth regions. In these growth regions, the crystals grow radially outward from the center of the growth regions. Therefore, Applicant’s arguments are not persuasive.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (571) 272-1731.

The examiner can normally be reached from 8:30 AM - 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and (571) 273-8300 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should any questions arise regarding access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Matthew C. Landau

December 14, 2005

SPE Kenneth Parker  
TL2800